REMARKS:

In view of the foregoing amendments and the following remarks please reconsider the current application.

In amending the claims there are now three independent claims, namely claims 1, 7 and 9. Total number of claims remains less than 20 and accordingly no additional claim fees are required.

The specification has been amended to correct the errors objected to by the examiner. Accordingly the references section has been cancelled from the application and the references have instead been inserted at the respective points of reference as requested by the Examiner.

Line 1 of the specification has also been amended to refer to the priority document in order to be consistent with the priority claim on the declaration which the Patent Office has already acknowledged on the filing certificate and on the image file wrapper.

Replacement drawings are attached herewith in which figures 2 through 5 have been labeled as prior art as requested by the examiner and in which the quality of the drawings has been improved. No new matter has been entered. The objections to the drawings should thus now also be overcome.

The claims have been amended to overcome the examiner's objections to the wording thereof. Furthermore the claims have been amended in order ensure proper antecedent basis for the various terms introduced.

With regard to the subject matter of the claims, claim 1 has been amended to refer to a method of including an impermeable object in a fluid simulation by identifying surfaces of the object to define cells contained within the object and within the fluid closest to the object surfaces to clearly define a practical application for the subsequent steps of assigning a value to the velocity vectors and removing the

normal component of motion of the fluid into the impermeable objects. The now amended claim 1 provides a clear solution to the problem of incorporating impermeable objects into a fluid simulation so as to satisfy the requirements of patentable subject matter that a practical application is defined.

In amending claim 1, further emphasis has been placed on *identifying surfaces of the impermeable object within the given region* as a limitation which overcomes the examiner's cited prior art reference to Stam. The prior art document cited by the examiner and belonging to Stam does not disclose or otherwise suggest how to incorporate impermeable objects within the given region of a fluid simulation. Although boundary conditions are noted, there is no mention of an impermeable object within the given region of a fluid simulation. Accordingly the steps defined in the now amended claim 1 clearly distinguish the present invention from the prior art cited.

As noted by the Examiner, Stam notes at column 4, line 6 that Navier-Stokes equations are used, however the use of such equations does not necessarily include boundary conditions defined by impermeable objects. It is apparent from Figures 4A and 4B that Stam did not contemplate the possible addition of impermeable objects contained within the defined grid as pictured. Accordingly, it is not clear from the teaching of Stam as to whether an impermeable object can be treated in the same manner as a boundary not including impermeable objects within the given region of the fluid simulation.

Even if one considers the boundary of Stam to include impermeable objects as suggested by the Examiner, there is no other consideration by Stam as to what additional conditions should be met in order to successfully incorporate an impermeable object into a fluid simulation. Simply mentioning that the boundary conditions should be such that the normal component of the velocity field is zero at the boundary is not enough to solve the problem of incorporating impermeable objects

into the given region of the fluid. The present invention according to Claim 1 solves the problems not addressed by the prior art by *setting velocity values within the impermeable objects*, which would be outside of the boundary noted in Stam and accordingly falls outside of anything contemplated by Stam.

As noted by the Examiner, Stam notes at column 7, lines 19-21 that the boundary conditions should be such that the normal component of the velocity field is zero at the boundary. There is no teaching as to what other conditions should be applied to the boundary of an impermeable object within the fluid or whether the boundary even can include impermeable object surfaces within the given region of the fluid. Accordingly Stam does not define or contemplate *cells contained within an impermeable object* nor does Stam define or contemplate *closest fluid containing cells within the fluid* as noted in the current claim 1. Claim 1 further elaborates that the *cells within the impermeable object are assigned values copied from the closest fluid containing cells*. Contrary to the Examiner's objection in this regard, Stam makes no suggestion as to assigning values to cells within an impermeable object nor is there any suggestion that the values be copied from closest fluid containing cells.

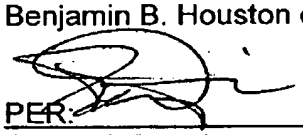
In addition to being distinguished so that Stam does not anticipate the current claim, it is furthermore respectfully submitted that claim 1 cannot be considered obvious in view of the prior art as the limitations of *assigning a value to the velocity vectors of cells within the object* and *removing the normal component of the cells within the object when motion of the fluid is into the object* provides a solution to a problem that cannot even be recognized by Stam. As the problem is not even recognized in the prior art, it follows that the solution as defined in the present invention therefore also cannot be obvious in view of the prior art. It is respectfully submitted therefore that claim 1 should now be in condition for allowance.

Independent claim 7 has been amended similarly to independent claim 1 noted above in that it has been amended to define a method of incorporating impermeable objects into a fluid simulation including the limitation of identifying surfaces of the impermeable objects within the given region of fluid simulation. The steps of defining the impermeable object as a level set including values representing a distance to the nearest surface of an impermeable object provide a solution to the problem of incorporating impermeable objects into a fluid simulation and therefore provide a practical application for the steps of the method. As the examiner indicated the subject matter of claim 7 was considered allowable over the prior art, it is believed that claim 7 should now be in condition for allowance.

New independent claim 9 includes all of the subject matter of claim 8 and the base claim upon which it depended so that it should now also be in condition for allowance as previously indicated by the examiner.

Favorable reconsideration of this application is earnestly solicited.

Respectfully submitted
Benjamin B. Houston et al



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CERTIFICATION OF FACSIMILE TRANSMISSION

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Heather Kirkpatrick

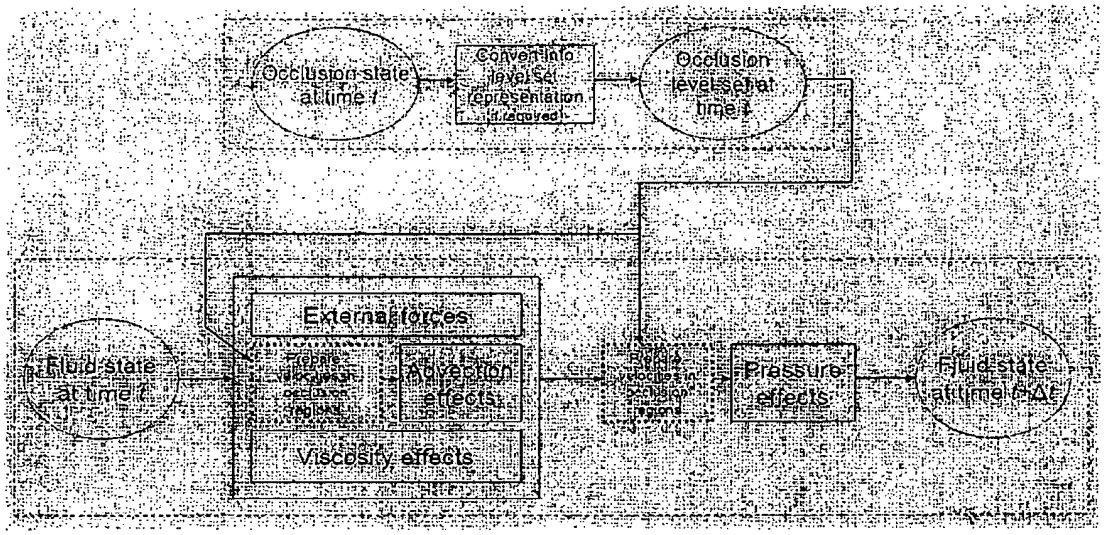

Figure 1

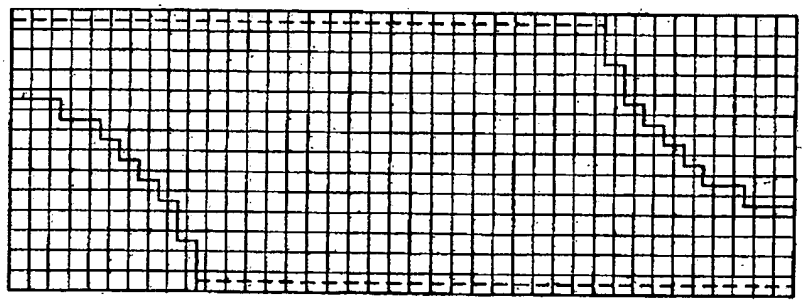

Figure 2

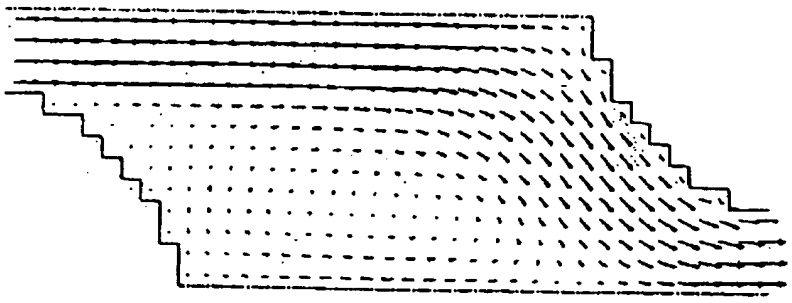

Figure 3

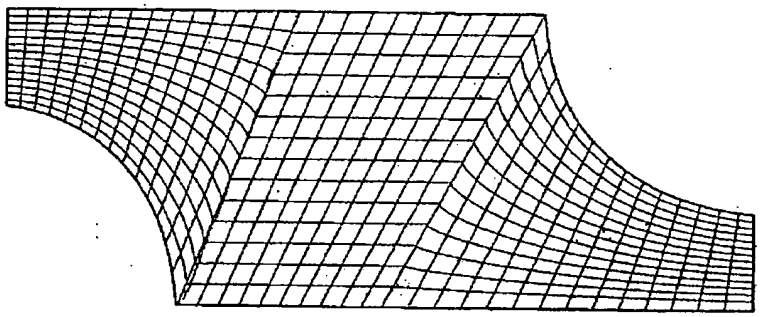

Figure 4

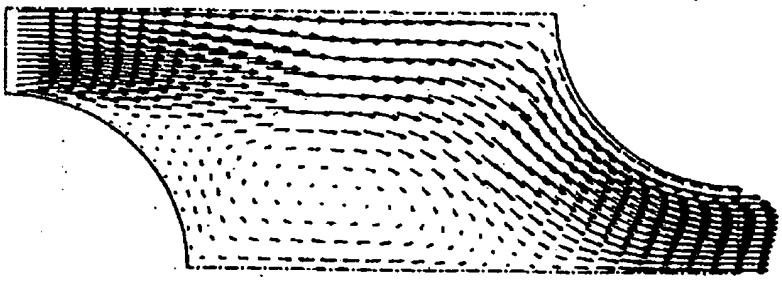

Figure 5

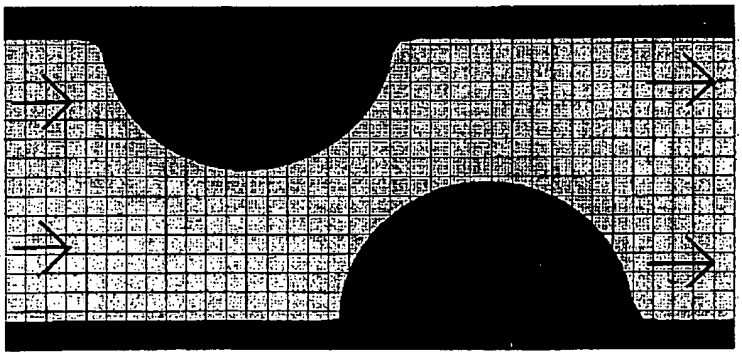

Figure 6

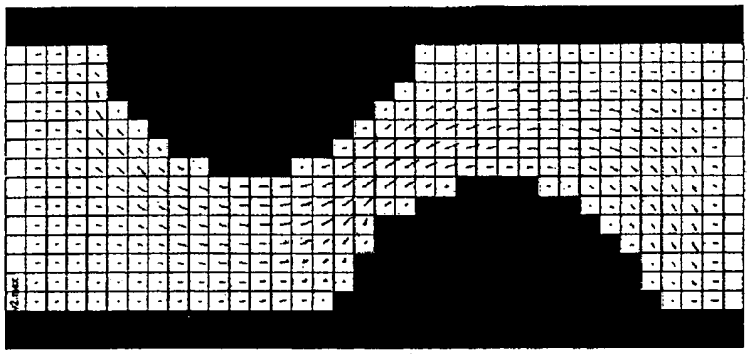

Figure 7

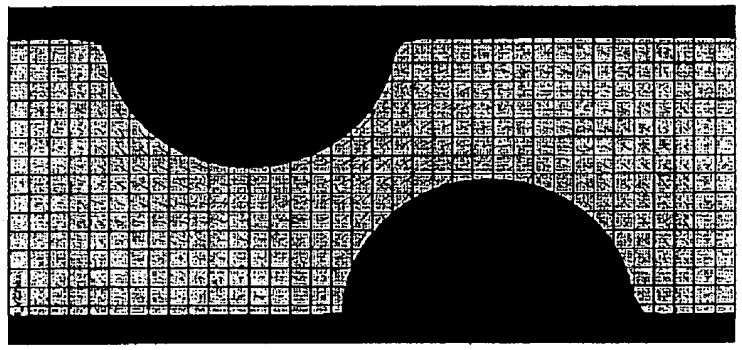

Figure 8

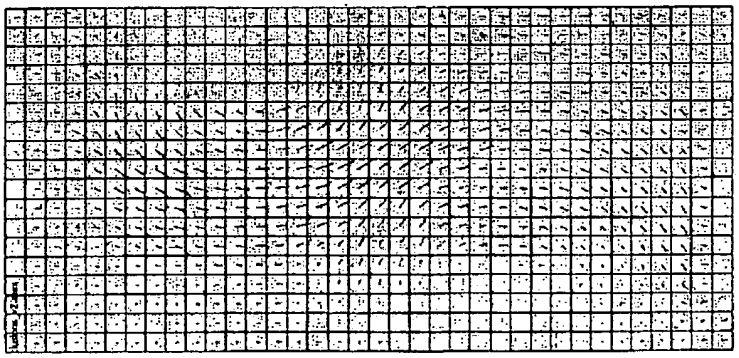

Figure 9